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REMARKS

Applicant thanks the Examiner for the courtesies extended during an interview held January 25, 2006. The following remarks summarize and expand on the discussion held at the interview.

In an Office Action mailed November 2, 2005, the Examiner indicated that claims 6-18 and 20-24 would be allowable if rewritten in independent form. Claims 25-38 were withdrawn. It was indicated that claim 39 would not be examined, but that claim 40 would be examined.

By the present amendment, claims 25-39 are cancelled and claims 1, 6, 14, 20 and 40 have been amended.

At the interview, the Examiner and Applicant's representative discussed claim 1 and some proposed changes to claim 1. Claim 1 is amended herein to include the clarifications discussed at the interview. Specifically, claim 1 has been amended to clarify that the thermoacoustic core, the gas and the alternator define a resonating system with a resonating mass. The alternator has a moving mass that serves as a substantial portion of this resonating mass, which has now been better defined. Additionally, the last phrase of the claim has been modified to provide that the moving mass substantially reduces the pressure oscillation frequency of the resonating system as compared to a system without the moving mass.

At the interview, the Examiner expressed that these proposed changes would help to clarify the claim, but expressed concern that the claim may still be obvious in view of the combination of the De Blok and Kolm patents. As explained by Applicant's representative at the interview, the Kolm transducer fails to provide a moving mass that forms a substantial portion of the resonating mass of a system, even if it were substituted in the De Blok design. In other words, substituting a transducer from Kolm into a thermoacoustic system, such as De Blok, would result in the need for

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a much larger housing or a much higher resonant frequency, since the Kolm transducer would not provide a resonating mass to lower the resonant frequency or reduce the size of the housing. The Examiner expressed that if the term "substantially" were interpreted very broadly, it may be argued that Kolm has a moving mass that may have some small effect on the oscillation frequency. Assuming for the sake of argument that the Kolm transducer would have some small effect on resonant frequency, Applicant submits that this does not meet the limitations that the alternator must have a moving mass that serves as a substantial portion of the resonating mass inside the housing. The term "substantial" does not mean "slightly" or "small." The term "substantially" has been at issue in a number of Federal Circuit cases and the Court has held that "the term 'substantial' is a meaningful modifier implying 'approximate' rather than 'perfect.'" Liquid Dynamics Corp. v Vaughn Co., Inc., 355 F.3d 1361, 1368 (Fed. Cir. 2004). Further, in Cordis Corp. v. Medtronic AVE, Inc., 339 F.3d 1352, 1361 (Fed. Cir. 2003), the court refused to impose a precise numeric constraint on the term "substantially uniform thickness," noting that the proper interpretation of this term was "of largely or approximately uniform thickness" unless something in the prosecution history imposed the "clear and unmistakable disclaimer" needed for narrowing beyond this plain-language interpretation." In Anchor Wall Sys. v. Rockwood Retaining Walls, Inc., 340 F.3d 1298, 1311 (Fed. Cir. 2003), the court held that "the phrase 'generally parallel' envisions some amount of deviation from exactly parallel," and that "words of approximation, such as 'generally' and 'substantially,' are descriptive terms 'commonly used in patent claims to avoid a strict numerical boundary to the specified parameter.'" Numerous other cases, and the MPEP itself (*see* §2173.05(b)(D)) point to the conclusion that the word "substantial" should be interpreted to mean "considerable" or "significant." Courts have also looked to whether one of ordinary skill in the art would understand what is meant by the term

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"substantial." In this case, those of skill in the art of thermoacoustics would understand that the term "substantial" as used in claim 1 describes a system wherein the moving mass alternator provides a "significant" or a "considerable" portion of the resonating mass.

Applicant further submits that the combination of De Blok and Kolm is neither suggested or motivated by the prior art. In order to combine these references in a way that will actually work requires inventing a way to combine them. If a Kolm transducer were substituted into the De Blok device, the resulting device would have to be modified substantially, such as by dramatically increasing the size of housing. Even then, the combination would not provide a system wherein the moving mass of the transducer substantially lowers the pressure oscillation frequency in the housing. Kolm is trying to make the transducer ITSELF be a resonant system (it's own mass resonating with its own springiness) that is tuned to the center of a frequency band of acoustic energy that is traveling by and not well coupled with the transducer. At its resonance, the Kolm transducer presents a resistive impedance, not a mass impedance. Only a small fraction of the energy that is passing by is expected to be absorbed by any individual transducer, as evidenced by Kolm's use of a large number of transducers in parallel. Put another way, the Kolm transducer does not hold a substantial portion of the kinetic energy of the oscillation; and the muffler and transducer combined is not a system in resonance. In the embodiment of the present invention of claim 1, there is a good coupling of energy between the thermoacoustic core and the piezoelectric transducer. Consequently, the total device is substantially smaller than half a wavelength of sound because it does not need a large volume of gas to be the resonating mass that holds the kinetic energy of the resonance.

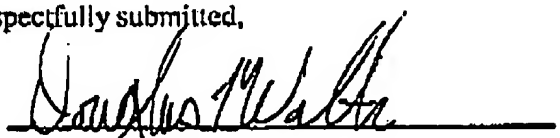
In light of the above, Applicant submits that claim 1 is not obvious in view of the cited combination of De Blok and Kolm. As such, it is in condition for allowance. Additionally, the claims that depend from claim 1 are allowable therewith.

Claims 6, 14 and 20 were indicated as allowable if rewritten in independent form. They have been rewritten herein and are therefore in condition for allowance, along with the claims that depend therefrom.

Claim 40 has been amended in a manner similar to claim 1 and is in condition for allowance for the same reasons discussed above.

Any question should be directed to Applicant's below-signed representative.

Respectfully submitted,

By: 

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